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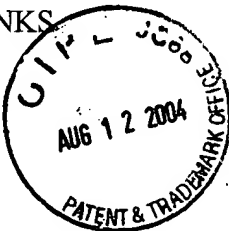
Applicant: Gregory M. Chrysler et al.

Title: FOLDED FIN HEAT SINKS

Docket No.: 884.148US1

Filed: August 18, 1999

Examiner: Christopher Atkinson



Serial No.: 09/376,875

Due Date: August 9, 2004

Group Art Unit: 3753

Appeal Brief--Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

- ☒ A return postcard.
- ☒ Appellant's Brief on Appeal (14 Pages), in triplicate.
- ☒ Authorization to charge Deposit Account 19-0743 in the amount of \$330.00 to cover the fee for submission of a brief in support of an appeal.

If not provided for in a separate paper filed herewith, Please consider this a **PETITION FOR EXTENSION OF TIME** for sufficient number of months to enter these papers and please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.

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Name

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Signature

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(GENERAL)



APPELLANT'S BRIEF ON APPEAL

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PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
)	
Gregory M. Chrysler et al.)	Examiner: Christopher Atkinson
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Serial No.: 09/376,875)	Group Art Unit: 3753
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Filed: August 18, 1999)	Docket: 884.148US1
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For: FOLDED FIN HEAT SINKS)	
Assignee: Intel Corporation)	

APPELLANT'S BRIEF ON APPEAL

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is presented in response to the Final Office Action mailed on March 9, 2004, rejecting claims 22-24, 27-32 and 36-43 of the above identified application, and further in support of the Notice of Appeal to the Board of Patent Appeals and Interferences mailed June 9, 2004, received by the USPTO on June 14, 2004. At this time Appellant withdraws claims 36-43 from consideration. Nine claims remain for consideration.

This Appeal Brief is filed in triplicate. The Commissioner of Patents and Trademarks is hereby authorized to charge the requisite fee of \$330.00 as set forth in 37 CFR 1.17(c), and any other fees which may be due, to Deposit Account No.19-0743. Appellant reserves the right to submit a request for an oral hearing at a later time.

1. REAL PARTY IN INTEREST

The real party in interest of the above-captioned patent application is the Assignee, INTEL CORPORATION.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant which will have a bearing on the Board's decision in the present appeal.

3. STATUS OF THE CLAIMS

At this time, Appellant withdraws claims 36-43 from consideration. Appellant reserves the right to prosecute these claims at a later date.

Claims 22-24 and 27-32 are pending and are all presently rejected at least twice. These nine claims are the subject of the present appeal (Appendix I lists the claims on appeal).

4. STATUS OF AMENDMENTS

No amendments have been filed subsequent to the Office Action mailed to Appellant on March 9, 2004. The claims are, therefore, in the form they were in after the Amendment and Response filed by Appellant on August 25, 2003. It is further noted that such claims also remained in the same form after the Response to Notice of Non-Compliant Amendment filed by Appellant on December 15, 2003 in response to a Notice of Non-Compliant Amendment mailed to Appellant on November 13, 2003.

However, as noted above, Appellant withdraws claims 36-43 from consideration.

5. SUMMARY OF THE INVENTION

A concise explanation of the claimed embodiments defined in the claims in the Appeal is detailed as follows: A claimed embodiment includes a heat sink. Reference can be made to FIGS. 1-10 for example embodiments. Reference can also be made to independent claim 22 for an illustration of one embodiment. (See also FIGS. 1, 6 and 8). In this embodiment, the heat sink includes a thermally conductive sheet creased in an accordion fold to form a plurality of surfaces defining a fin bundle (110) having a top (112) and a bottom (114), each fin having an aspect ratio of between about 20:1 and 30:1, wherein the top (112) of the fin bundle (110) is modified to create a plurality of trimmed openings (116) that extend along a portion of the length of the top (112) of the fin bundle (110), wherein the top (112) of the fin bundle (110) comprises a plurality of arches and the trimmed openings (116) are formed by removing the plurality of arches along the portion of the length of the top (112), wherein more than fifty percent of the plurality of surfaces are receptive to an introduced convection medium (640); a fan (120) for introducing the convection medium (640), the fan (120) attached to the top (112) of the fin bundle (110); a base (130) attached to the bottom (114) of the fin bundle (110); and a clip (860₀) to attach and thermally couple the base (130) to the bottom (114) of the fin bundle (110), the clip (860₀) not in contact with the top (112) of the fin bundle (110) when in place.

6. ISSUES PRESENTED FOR REVIEW

1. Whether claims 22-24 and 27 were properly rejected under 35 USC 103(a) as being unpatentable over Jean or Morosas in view of Lee and Wyler et al.
2. Whether claims 28-31 were properly rejected under 35 USC 103(a) as being unpatentable over Jean or Morosas in view of Lee and Bishop et al.
3. Whether claim 32 is properly rejected under 35 USC 103(a) as being unpatentable over Jean or Morosas in view of Lee and Bishop et al. as applied to claims 28-31, and further in view of Yeh or Wyler et al.

7. GROUPING OF CLAIMS

Although Appellant considers each pending claim to be separately patentable, and the claims do not stand or fall together, the rejections of the claims will be addressed in three groups to mirror the Examiner's rejections. These groups are as follows:

1. Claims 22-24 and 27.
2. Claims 28-31.
3. Claim 32.

8. ARGUMENT

1) Applicable Law

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir.1988). As part of establishing a *prima facie* case of obviousness, the Examiner must show that some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art would lead an individual to combine the relevant teaching of the references. *Id.*

The court in *Fine* stated that:

Obviousness is tested by "what the combined teaching of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 878 (CCPA 1981)). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined *only* if there is some suggestion or incentive to do so."

Id. (emphasis in original).

The M.P.E.P. adopts this line of reasoning, stating that

"In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally

available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Appellant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991))". *M.P.E.P.* § 2142.

The test for obviousness under §103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 USPQ 543, 551 (Fed. Cir.1985). The Examiner must, as one of the inquiries pertinent to any obviousness inquiry under 35 U.S.C. §103, recognize and consider not only the similarities but also the critical differences between the claimed invention and the prior art. *In re Bond*, 910 F.2d 831, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990), *reh'g denied*, 1990 U.S. App. LEXIS 19971 (Fed. Cir.1990). Further, the Office Action must provide specific, objective evidence of record for a finding of a suggestion or motivation to combine reference teachings and must explain the reasoning by which the evidence is deemed to support such a finding. *In re Sang Su Lee*, 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002). Finally, the Examiner must avoid hindsight. *In re Bond* at 834.

Additionally, while it is true that it is the teachings, not the actual physical embodiments, of references that are considered in making an obvious determination under 35 USC 103 (*In re Keller* at 425), on the other hand, it is equally true that if the teachings of a prior art reference would lead one skilled in the art to make a modification which would render another prior art device inoperable, then such a modification would generally not be obvious. *In re Gordon*, 733 F2d 900,902, 2212 USPA 1125, 1127 (Fed Cir. 1984).

2) Rejections

Appellant respectfully submits that the Office Action does not make out a *prima facie*

case of obviousness because not all of the claim elements are taught by the references and even if the references did teach all of the elements of the claims, there is no motivation to combine the references.

a) The Rejection of Claims 22-24 and 27 under 35 USC 103(a)

Claims 22-24 and 27 were rejected under 35 USC 103(a) as being unpatentable over Jean or Morosas in view of Lee and Wyler et al. The Appellant respectfully traverses the rejection and requests the Board to consider the following:

The Office Action acknowledges that neither Jean nor Morosas disclose, "a clip, the claimed aspect ratio and the folded fin having arches." However, the Office Action suggests that Lee teaches a folded fin having semi-circular arches and an aspect ratio within the claimed range and that Wyler teaches a clip. According to a statement on page 6 of the Office Action, this is to be interpreted to mean that Jean is being relied on for fin openings, but not for having folded fins having semi-circular arches. Since the Office Action states that both Morosas and Jean disclose all of the claimed features except those listed, it is assumed that Morosas is also being relied on for having fin openings. Appellant respectfully submits that portions of a reference which teach away from the claimed invention must also be considered.

The Office Action has failed to comply with the requirement to show that there is a suggestion or motivation, either in the cited references themselves or in the knowledge generally available to an art worker, to modify the reference(s) or to combine reference teachings so as to arrive at the claimed invention since no specific objective evidence of record has been provided for a finding of a suggestion or motivation to combine reference teachings and no explanation of the reasoning by which the evidence is deemed to support such a finding has been given.

Regarding the combination of Lee with either Jean or Morosas, Appellant respectfully submits that Lee is directed to solving problems associated with heat dissipation devices having increased heat transfer surface area. Such problems include the phenomenon known as a

"choking condition" which can actually produce a stoppage of fluid flow (col. 2, lines 13-44) and the presence of a restricted fluid flow or air pattern which allows flow only in the direction of fin length (col. 2, lines 45-62). Lee attempts to solve these problems by providing thick and tall corrugated fins arranged in abutting contact with each other and offset a predetermined distance from each other. (col. 4, lines 1-20). The fin assemblies can take on a variety of configurations (See FIGS. 2-4) including semi-circular arches wherein the fins are substantially parallel to each other, non-parallel saw-tooth shaped, non-parallel V-shaped, etc. In contrast, Jean is attempting to solve the problem associated with devices having thick fins, which prevent quick heat dissipation (See prior art FIGS. 1 and 2; col. 1, lines 1-31). The use of openings in the non-parallel V-shaped fins of Jean actually increases the available surface area as is known in the art, although Jean recognized that the openings also increase the *rate* at which a heat sink can cool a device. Therefore, the two references are clearly attempting to solve different problems and therefore seek very different solutions. Additionally, although Jean is aware of substantially parallel fins having a semi-circular arch shape as is evidenced by prior art FIGS. 1 and 2, Jean fails to recognize the advantages inherent in using this shape in combination with openings to increase surface area. Clearly, Jean does not teach or suggest fins having a semi-circular arch. Additionally, there is no teaching or suggestion in Morosas to use fins having semi-circular arches.

Clearly there is no suggestion or motivation in the cited references or to those skilled in the art to use a fin bundle comprising "a plurality of trimmed openings that extend along a portion of the length of the top of the fin bundle, wherein the top of the fin bundle comprises a plurality of arches and the trimmed openings are formed by removing the plurality of arches along the portion of the length of the top" as recited in claim 22. Appellant respectfully submits that the combination of Lee with Jean or Morosas cannot be made without using the Appellant's disclosure as a guide.

Regarding the combination of Wyler with either Jean or Morosas, Appellant respectfully

submits that Wyler is directed to a folded fin heat sink to be clamped onto circuit components with a complex spring clamp 121 which extends under the entire length of the fin structure and includes a series of flexible linkages for pressing a trough against the base plate. (See also FIG. 13 and col. 9, line 18 through col. 10, line 38).

There is no teaching or suggestion in either Jean or Morosas to use either the spring clamp shown in Wyler as suggested by the Office Action or "a clip not in contact with the top of the fin bundle when in place," as recited in claim 22. Furthermore, Morosas discusses a plurality of spaced cooling fins *required* to be fixed not only to a base, but also to a top wall of a housing by brazing or bonding to form an integral unit. As such there is no need for a removable clip in the devices of Morosas.

The references also fail, when combined, to teach each and every element of claim 22.

As noted above, Wyler is directed to a complex spring clamp 121 which is necessarily in contact with the ridges in one embodiment or the grooves or troughs in another embodiment when in place, and not "a clip not in contact with the top of the fin bundle when in place," as recited in claim 22. (See col. 9, lines 18-21). Furthermore, it is the housing in Morosas which has an aperture aligned with an outlet opening of the fan assembly. There are no openings in the fins of Morosas.

Thus, claim 22 is allowable because there is no motivation to combine the references and even when combined, the combination fails to teach each and every element of the claim.

Claims 23-24 and 27 depend, directly or indirectly, on claim 22 and are patentable over Jean or Morosas in view of Lee and Wyler for the reasons argued above, plus the elements in the claims. If an independent claim is nonobvious under 35 USC 103, then any claim depending therefrom is nonobvious. See MPEP 2143.03.

Withdrawal of the rejection is therefore respectfully requested.

b) The Rejection of Claims 28-31 under 35 USC 103(a)

Claims 28-31 were rejected under 35 USC 103(a) as being unpatentable over Jean or Morosas in view of Lee and Bishop et al. The Appellant respectfully traverses the rejection and requests the Board to consider the following:

The Office Action again acknowledges that neither Jean nor Morosas disclose "the claimed aspect ratio, the folded fin having arches and the second fan." The Office Action again suggests that Lee teaches a folded fin having semi-circular arches and an aspect ratio within the claimed range and further suggests that Bishop teaches first and second fans.

The Appellant again respectfully submits that there is no teaching or suggestion to combine the reference teachings nor did the Office Action provide any specific objective evidence or reasoning to do so.

The combination of Lee with either Jean or Mosaras has been discussed above. Clearly there is no suggestion or motivation in the cited references or to those skilled in the art to use a fin bundle having "a plurality of trimmed openings that extend along a portion of the length of the top of the fin bundle, wherein the top of the fin bundle comprises a plurality of arches and the trimmed openings are formed by removing the plurality of arches along the portion of the length of the top" as recited in claim 28.

Regarding the combination of Bishop with either Jean or Mosaras, Appellant respectfully submits that although the Office Action is relying on Bishop for teaching first and second fans, it is important to rely on a prior art reference *in its entirety*, including portions that teach away from the claimed invention. As such, Bishop discusses a method and apparatus for cooling a heat source using a base that includes flanges referred to as "rectangular-shaped fins," such flanges in contact on their top surfaces with a plate 16 having openings 29 (See col. 4, lines 8-16). Bishop does not provide openings in its "fins," which again demonstrates a lack of appreciation of the inherent benefit provided by such openings. Such a fin structure teaches away from the claimed invention.

There is no teaching or suggestion in either Jean or Morosas as to the desirability of

providing a second fan nor is there an indication of any appreciation of the problem being solved by Applicant's invention. In fact, Morosas appears to teach away from the use of multiple fans by noting problems with the use of multiple fans with a general forced convection system (col. 1, lines 23-27).

Furthermore, whether or not Bishop teaches the use of two fans is immaterial to patentability as Appellant is not claiming to be the first to use more than one fan. Appellant is the first, however, to provide the combination of elements as recited in claim 28.

The references also fail, when combined, to teach each and every element of claim 28.

As noted above, it is the housing in Mosaras which has an aperture aligned with an outlet opening of the fan assembly. There are no openings in the fins of Mosaras.

Thus, claim 28 is allowable because there is no motivation to combine the references and even when combined, the combination fails to teach each and every element of the claim.

Claims 29-31 depend, directly or indirectly, on claim 28 and are patentable over Jean or Morosas in view of Lee and Bishop for the reasons argued above, plus the elements in the claims. If an independent claim is nonobvious under 35 USC 103, then any claim depending therefrom is nonobvious. See MPEP 2143.03.

Withdrawal of the rejection is therefore respectfully requested.

c) The Rejection of Claim 32 under 35 USC 103(a)

Claim 32 is rejected under 35 USC 103(a) as being unpatentable over Jean or Morosas in view of Lee and Bishop et al. as applied to claims 28-31, and further in view of Yeh or Wyler et al. The Appellant respectfully traverses the rejection and requests the Board to consider the following:

Dependent claim 32 is allowable over Jean or Morosas in view of Lee and Bishop and further in view of Yeh or Wyler because the claim depends from allowable independent claim 28 and the suggested combination does not teach all the elements of claim 32 for all the reasons

stated above.

Regarding the combination of Yeh with Jean or Morosas in view of Lee and Bishop, Appellant further notes that Yeh discusses a single fastening "frame" having two vertical arms and a horizontal arm. Bishop uses flanges that are couched as "rectangular-shaped fins." (Fig. 3; col. 3, line 66). Yeh believes that devices using flanges, which are formed by extrusion molding, are defective in design (col. 1, lines 19-34). In order to combine the teachings of Yeh with the teachings of Bishop, the Office would have to remove the flange construction approach of Bishop. MPEP sec. 2143.01 states that, "if the proposed modification. . . would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render the claims *prima facie* obvious."

Regarding the combination of Wyler with Jean or Morosas in view of Lee and Bishop, Appellant again notes that Wyler is directed to a complex spring clamp, not a clip as recited in claim 32.

In contrast, claim 32 teaches the heat sink of claim 28 in combination with at least one clip to attach and thermally couple the base to the bottom of the fin bundle.

Thus, claim 32 is allowable because there is no motivation to combine the references and even when combined, the combination fails to teach each and every element of the claim.

Claim 32 depends directly on claim 28 and is patentable over Jean or Morosas in view of Lee and Bishop further in view of Yeh or Wyler for the reasons argued above, plus the elements in the claims. If an independent claim is nonobvious under 35 USC 103, then any claim depending therefrom is nonobvious. See MPEP 2143.03.

Withdrawal of the rejection is therefore respectfully requested.

9. SUMMARY

It is respectfully submitted that a *prima facie* case of obviousness under 35 USC 103 has not been established. Therefore, it is respectfully requested that the rejection of claims 22-24 and

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27-32 be reconsidered and withdrawn. The Appellant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to contact Appellant's Attorney, Barbara Clark, at 515-233-3865, or the undersigned attorney at 612-349-9592, if prosecution will be assisted thereby.

Respectfully submitted,

GREGORY M. CHRYSLER ET AL.

By their Representatives,

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Name KACIA LEE Signature Kacia Lee

APPENDIX I

The Claims on Appeal

22. (Previously Presented) A heat sink, comprising:

a thermally conductive sheet creased in an accordion fold to form a plurality of surfaces defining a fin bundle having a top and a bottom, each fin having an aspect ratio of between about 20:1 and 30:1, wherein the top of the fin bundle is modified to create a plurality of trimmed openings that extend along a portion of the length of the top of the fin bundle, wherein the top of the fin bundle comprises a plurality of arches and the trimmed openings are formed by removing the plurality of arches along the portion of the length of the top, wherein more than fifty percent of the plurality of surfaces are receptive to an introduced convection medium;

a fan for introducing the convection medium, the fan attached to the top of the fin bundle;

a base attached to the bottom of the fin bundle; and

a clip to attach and thermally couple the base to the bottom of the fin bundle, the clip not in contact with the top of the fin bundle when in place.

23. (Previously Presented) The apparatus of claim 22, wherein the sheet is made from an alloy containing aluminum.

24. (Previously Presented) The apparatus of claim 22, wherein the base is made out of manufactured diamond.

27. (Previously Presented) The heat sink of claim 22 wherein the fan guides the convection medium to flow substantially parallel to the fin bundle and substantially parallel to the base.

28. (Previously Presented) A heat sink, comprising:

a thermally conductive sheet creased in an accordion fold to form a plurality of surfaces defining a fin bundle having a top and a bottom, each fin having an aspect ratio of between about

20:1 and 30:1, wherein the top of the fin bundle is modified to create a plurality of trimmed openings that extend along a portion of the length of the top of the fin bundle, wherein the top of the fin bundle comprises a plurality of arches, and the trimmed openings are formed by removing the plurality of arches along the portion of the length of the top, wherein more than fifty percent of the plurality of surfaces are receptive to an introduced convection medium;

a first fan for introducing the convection medium in a first direction, the fan attached to the top of the fin bundle;

a second fan for introducing the convection medium in a second direction, the second fan attached to the front of the folded fin structure; and

a base attached to the bottom of the fin bundle.

29. (Previously Presented) The heat sink of claim 28 wherein the first direction is substantially parallel to the fin bundle and the second direction is substantially parallel to the base.

30. (Previously Presented) The heat sink of claim 28 wherein the fin bundle is attached to the base with bonding means.

31. (Previously Presented) The heat sink of claim 30 wherein the bonding means is selected from the group consisting of brazing, epoxy and soldering.

32. (Previously Presented) The heat sink of claim 28 further comprising at least one clip to attach and thermally couple the base to the bottom of the fin bundle.